Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	
Implementation of Section 309(j) of the Communications Act Competitive Bidding	PP Docket No. 93-253

COMMENTS OF THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

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SUMMARY

In its Notice, the Commission stresses the importance of adopting a competitive bidding system that is easy to administer and that minimizes costs to applicants and the Commission. NTIA agrees that these are important considerations. It is equally important, as the Commission recognizes, however, to choose a system that best serves the statutory objectives of ensuring an efficient allocation of licenses, recovery for taxpayers of the economic value of the spectrum resource, and economic opportunity for a broad range of applicants. Only then will the public realize the full benefits of this new and innovative regulatory approach.

Because of the need to develop workable procedures for the award of licenses for broadband personal communications services (PCS) in the next six months, NTIA focuses its analysis on issues relating to the use of competitive bidding for broadband PCS. The Commission has tried to grapple with the complexities of the PCS licensing scheme by proposing to allow bidding on both individual PCS licenses as well as specified groups of PCS licenses. However, the Commission's proposal does not adequately capture the "value interdependencies" that exist among licenses in adjacent geographic areas and among spectrum blocks in specific locations.

NTIA therefore proposes that the Commission adopt an iterative combinatorial auction mechanism for PCS licenses that

would be conducted electronically, using a computer and terminals for the bidding process. This "electronic iterative combinatorial auction" (EICA), which is comparable to an English auction for various combinations of licenses, is a simpler and faster way to meet the statutory goals of competitive bidding. While NTIA recognizes that it will take some effort to implement the specific procedures necessary to conduct an EICA, we believe that this proposal could be implemented within the mandatory deadlines and would best ensure the rapid deployment of PCS technology for the benefit of the public.

NTIA also discusses the use of reserve prices and royalty payments to prevent the award of licenses for trivial amounts. NTIA prefers the use of royalties for such purposes.

We also consider the special treatment to be afforded to small businesses, rural telephone companies, and businesses owned by minorities and women, which the Commission calls "designated entities." We agree that access to capital is one of the most important determinants of full participation in the communications field, and that measures, such as reserving spectrum blocks for bidding by designated entities, should be adopted to promote greater economic opportunity for these statutorily designated groups.

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NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

The National Telecommunications and Information Administration (NTIA), as the executive branch agency principally responsible for the development and presentation of domestic and international telecommunications and information policy, and for management of federal use of the radio frequency spectrum, respectfully submits the following comments in response to the Commission's Notice of Proposed Rulemaking in the above-captioned proceeding.[1]

I. INTRODUCTION

The Notice presents a historic opportunity for the Federal Communications Commission (Commission) -- the chance to design a competitive bidding mechanism for the assignment of spectrum licenses in the United States that will represent a significant improvement over the way licenses have been awarded up until now. We commend the Commission on its framing of the issues in this

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[1] Implementation of Section 309(j) of the Communications Act Competitive Bidding, Notice of Proposed Rulemaking, PP Docket No. 93-253, FCC 93-455 (released Oct. 12, 1993) (Notice).

complex and difficult proceeding, and recognize that it faces a monumental task in adopting competitive bidding procedures within the deadline mandated under the Omnibus Budget Reconciliation Act of 1993 (Budget Act).[2]

The Commission seeks comment on the appropriateness of various specific auction procedures under the Budget Act. It also considers in some depth such matters as application processing requirements, up-front payments, deposits, procedures to be followed to resolve qualification issues, and many others. The Commission then discusses how its proposed procedures could be applied to three specific services -- personal communications services (PCS), private radio services, and common carrier radio services.

The Commission's careful and thorough consideration of the numerous issues relating to application, bidding, and licensing requirements resolves many questions that must be addressed before competitive bidding can become a reality. While recognizing the importance of properly designing auction rules for private radio and common carrier services generally, and of specific application requirements for all the services, NTIA focuses its discussion in this pleading on issues relating to the design of auctions for broadband PCS licenses in the 2 GHz region

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[2] Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, Title VI -- Communications Licensing and Spectrum Allocation Improvement, § 6002(d)(1), 107 Stat. 312 (1993) (Budget Act).

of spectrum.[3] The characteristics of the particular type of license being awarded by competitive bidding will have a significant impact on the performance of various alternative auction methods. Because the Commission is statutorily required to begin assigning PCS licenses by May 7, 1994,[4] it is essential that it focus first on selecting the appropriate auction form for that process.[5]

The Budget Act mandates that the Commission adopt a system of competitive bidding that serves a number of distinct objectives: to facilitate the rapid deployment of new technologies; to ensure that licenses are awarded to a wide variety of applicants, including small businesses, rural telephone companies, and businesses owned by minorities and women; to recover for the public a portion of the value of spectrum and avoid unjust enrichment through the methods employed to award licenses; and to ensure efficient use of spectrum.[6] In

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[3] See Amendment of the Commission's Rules to Establish New Personal Communications Services, Second Report and Order, Gen. Docket No. 90-314, FCC 93-451 (released Oct. 22, 1993) (PCS Second Report and Order). For simplicity, the use of the term PCS in this pleading generally refers to broadband PCS as defined by the Commission in the PCS Second Report and Order, para. 24.

[4] See Budget Act, § 6002(d)(2)(B). The statute does not, however, distinguish between broadband and narrowband PCS.

[5] We agree with the Commission's conclusion in para. 116 of the Notice that PCS is a type of use to which competitive bidding should be applied. See Budget Act, § 6002(a), to be codified at 47 U.S.C. § 309(j)(2).

[6] See Budget Act, § 6002(a), to be codified at 47 U.S.C. § 309(j)(3).

the discussion below, and as considered in the accompanying staff paper,[7] we first discuss those characteristics of PCS licenses that we believe will have a critical impact on the performance of various auction alternatives, followed by a description of the Commission's auction proposal. We then set forth NTIA's proposal, an electronic auction form, that we believe will better serve the statutorily mandated objectives.[8] The use of an electronic auction mechanism is both practical (as discussed below) and consistent with the Administration's recent initiatives to reinvent government[9] and to promote development of a National Information Infrastructure.[10] We follow with our views on the ramifications of limited competition in the bidding for PCS licenses. Finally, we discuss how the Commission's proposals will provide economic opportunity for a wide variety of applicants.

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[7] Mark Bykowsky & Robert Cull, Issues in Implementing a PCS Auction (Nov. 10, 1993) (NTIA Staff Paper), attached hereto as Attachment 1.

[8] Recognizing that NTIA's proposal differs from the Commission's, it may be reasonable for the Commission to issue a public notice regarding NTIA's proposal and extend the deadline for reply comments, now due November 24, 1993, to permit additional comment on it.

[9] See Albert Gore, From Red Tape to Results: Creating a Government that Works Better and Costs Less, Report of the National Performance Review 112-15 (1993).

[10] See Albert Gore & Ronald Brown, The National Information Infrastructure: Agenda For Action, 58 Fed. Reg. 49,025, 49,026-27 (Sep. 21, 1993).

II. AUCTION DESIGN

A. Key Characteristics of PCS Licenses

There are two characteristics of PCS licenses that will have a significant impact on whether the Commission's proposed auction form will meet the Budget Act's objectives: the licenses will have different market values, reflecting varying economic and technical characteristics among the bands and geographic areas covered by the licenses; and the licenses will be "value interdependent."

First, PCS licenses will be heterogeneous commodities. The value of each license will depend on its unique attributes. In particular, the value of PCS licenses will vary significantly across different geographic areas, as the potential demand for this service will depend upon population density, transportation and employment patterns, and other socio-demographic factors. Thus, for instance, the value of a PCS license in a major city will almost certainly be higher than a license covering a rural area. Moreover, licenses in channel blocks A and B presumably will also be more valuable because they will cover a larger geographic area, based on Major Trading Areas (MTAs), instead of Basic Trading Areas (BTAs).[11]

The value of PCS licenses also will vary within each geographic area because of the differing amount of spectrum

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[11] See PCS Second Report and Order, paras. 64, 73, 76-77.

associated with each channel block. The value of each of the 30 MHz licenses for channel blocks A and B presumably will be greater than the 20 MHz license in channel block C or the 10 MHz licenses in channel blocks D, E, F, or G, even after accounting for differences in the sizes of the geographic areas covered. For instance, it is likely that licensees in the larger channel blocks will be able to offer a more comprehensive form of PCS service because of the larger spectrum allocation, or will be able to serve a greater number of customers.

Another factor that will cause the value of PCS licenses to differ is the presence of varying numbers of incumbent fixed microwave users in the PCS spectrum blocks to be assigned. These incumbent users, which potentially could interfere with PCS operations, are distributed unevenly throughout the United States and within PCS license areas. As a consequence, the value of licenses with equivalent amounts of bandwidth will vary both within and across geographic areas.

Second, PCS licenses will exhibit "value interdependencies" -- that is, the value a party places on a particular license will depend in part on what other licenses it acquires. For many foreseeable forms of PCS, users will likely want to maintain service while traveling from one license area to another. A prospective bidder will likely value geographically adjacent PCS licenses more highly than it would value the same number of

licenses scattered widely across the country, because with adjacent licenses it can offer a more comprehensive service that matches more closely the frequent travel patterns of many of its customers.[12] Similarly, interdependencies may exist among the spectrum blocks being licensed in any geographic area. Such interdependencies may arise, for example, if PCS providers find that they need more than a single spectrum license to offer service in a given area.[13]

These two characteristics of PCS licenses, taken together, present the Commission with a major challenge. PCS licenses will not be homogeneous commodities of uniform value, so there must be a mechanism that allows bidders to express their preferences for specific licenses. At the same time, bidders should have the ability to obtain groups of licenses through a combinatorial process so as to realize their interdependent value. A critical objective, therefore, is to craft an auction scheme that allows parties to obtain groups of heterogeneous licenses in an

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[12] While most major cellular companies have established "roaming" arrangements among themselves so that customers can continue to use their cellular phones when traveling outside the license areas of their cellular providers, such arrangements tend to be offered only as a premium service. The trend toward geographic clustering of cellular service areas through mergers, acquisitions, and "swaps" observed in the marketplace tends to confirm that there is some value interdependence among adjacent service areas.

[13] The Commission recognizes this possibility by permitting bidders (other than some incumbent cellular providers) to aggregate up to 40 MHz of spectrum in any area.

administratively practical manner, which will speed the deployment of PCS.

B. The Commission's Proposal

The Commission expresses a preference for ascending oral (English) bidding over sealed bidding as its "basic" auction mechanism, at least in part because an English auction efficiently provides bidders with information about each other's valuations.[14] It seeks comment on these bid forms as well as a variant of the ascending oral auction -- electronic bidding.[15]

For broadband PCS licenses in particular, the Commission proposes a hybrid "sealed-oral" combinatorial auction as a way to determine whether parties value licenses more individually or in groups. Under this proposal, the Commission would accept sealed bids for a predetermined group of licenses (all MTAs in the country[16] and, potentially, all BTAs within an MTA[17]), and then would conduct oral auctions sequentially for the individual licenses within that group in descending order of population.[18] The sealed bids would not be opened until after the completion of

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[14] Notice, para. 46.

[15] Notice, para. 39.

[16] Notice, para. 120.

[17] The Commission seeks comment on whether to use combinatorial bidding to facilitate the grouping of BTA licenses. Notice, para. 123.

[18] Notice, paras. 120, 123, 125.

oral bidding. The licenses would be awarded as a group if the sealed bid for the group exceeded the sum of the oral bids for the individual licenses, and otherwise would be awarded individually.[19] The Commission thus seeks to facilitate the efficient aggregation of licenses across geographic regions. The Commission also requests comment on whether to allow such combinatorial bidding to aggregate 10 MHz PCS licenses into 20 MHz or 30 MHz blocks,[20] and the sequence in which it should auction PCS licenses across spectrum blocks.[21]

NTIA agrees with the Commission that a form of combinatorial auction should be used to facilitate the aggregation of licenses, both across geographic regions and among different spectrum blocks in the same region. As set forth in the attached staff paper, however, we believe that the Commission should employ a variant of this approach to overcome the problems with certain aspects of its proposed combinatorial auction.[22]

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[19] The Commission also seeks comment on whether to use a second round of sealed bidding for winners of the first round. Notice, paras. 60, 120.

[20] Notice, para. 124.

[21] Notice, para. 125.

[22] We agree with the Commission that it has the authority under the Budget Act to design and conduct a combinatorial bidding system, and that its proposal is not inconsistent with the provisions of that Act. See Budget Act, § 6002(a), to be codified at 47 U.S.C. § 309(j)(7)(A). We believe that NTIA's proposal is similarly consistent with the Budget Act.

First, the Commission should give bidders greater flexibility to combine licenses during the auction. The Commission's proposal artificially limits the permissible combinations on which a party can bid. In particular, the only group of licenses that a bidder could acquire in the proposed auction process would be all the MTAs within the United States (the equivalent of a nationwide license), or potentially, the entire set of BTAs within a given MTA. The proposal does not go far enough in allowing bidders to satisfy their demand for particular groups of PCS licenses. Because of the limited grouping contemplated in the Notice, licenses are likely to be awarded to parties that do not value them the highest, which is inefficient.[23] As a consequence, there will likely be extensive transactions in licenses after the auction.[24]

Second, the bidding on various licenses should be conducted simultaneously, not sequentially, to the degree possible. Under the Commission's proposed hybrid sealed-oral combinatorial auction, there would be oral auctions conducted sequentially for every PCS license in the United States. Such sequential auctions

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[23] NTIA Staff Paper at 48, 64-65.

[24] The Commission assumes that, as a general matter, the resale of a license acquired by competitive bidding will not involve any unjust enrichment warranting restrictions on subsequent transfer because the auction winner has paid a "market price" for the license. It notes, however, that there may be a need to prevent unjust enrichment arising from the transfer of some licenses obtained by "designated entities," as defined by the Commission, pursuant to specific provisions designed to ensure their participation. See Notice, paras. 83-84.

will not adequately capture the interdependencies in the value that bidders place on PCS licenses.[25] As noted above,[26] PCS providers will have incentives to cluster geographically contiguous licenses in order, for example, to offer customers the ability to travel easily from one license area to another. Similar incentives can be expected for parties seeking to acquire more than one channel block in a given market.

In a sequential auction, the bidders for a license would not know whether they subsequently will win additional licenses that they desire. Moreover, the losing bidders for the first license may not bid as aggressively in a subsequent auction for an adjacent license, so the winner of the first license will not need to bid as high in order to win the second. As a consequence, in a sequential auction, PCS licenses will not necessarily go to the bidders that value them most highly, and, as a result, economic efficiency will suffer. Furthermore, the government will not recover as much of the value of the spectrum as it would if it were to auction those licenses simultaneously.[27]

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[25] In addition, it would take a relatively long time to complete sequential auctions for 2,562 separate PCS licenses, particularly if conducted by a human auctioneer. Such an approach could delay licensing unnecessarily for many areas of the country.

[26] See discussion supra at p. 6.

[27] NTIA Staff Paper at 48-49, 58-65.

For a sequential auction, the Commission also faces difficult decisions in ordering the sequence in which licenses will be offered. As discussed in the staff paper,[28] the order in which licenses are auctioned has a significant effect both on economic efficiency and expected revenue. If, for example, the Commission first auctions all channel blocks in a given market, it would be more time consuming and could be less efficient for parties to aggregate licenses across broader geographic areas.[29] Moreover, should the Commission choose to complete licensing for all licenses in the country in a given channel block before proceeding to the next channel block, it would be more difficult for parties to aggregate spectrum blocks in a given market.

Third, the Commission should allow for iterative bidding. Under the Commission's proposed two-step hybrid "sealed-oral" auction mechanism, bidders in the oral portion of the auction potentially could not respond to a higher bid submitted in the sealed portion of the auction, either by raising their bids

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[28] NTIA Staff Paper at 60-63.

[29] The Commission has requested comment on licensing spectrum blocks in descending size according to population, which is generally the process it used in the cellular radio service. If, for instance, the Commission offers the largest market first, a bidder may have an incentive to bid aggressively for that license because of its synergy valuation for the group of licenses it desires. As a consequence, however, the bidder may exhaust its financial resources, making the bidder less able to acquire licenses for the smaller, adjacent markets. On the other hand, if the Commission auctions the smallest market first, a bidder may have an incentive to underbid so as not to convey information to other bidders about its valuation of the license for the market hub to be auctioned later.

individually, or by coordinating with bidders for other licenses in order to raise the sum of their combined bids. Because the Commission's proposed process is not sufficiently iterative, a license may not be awarded to the party that values it most highly.[30]

Fourth, the Commission should not complicate the already complex task each bidder faces in developing its bids. A major potential source of such complexity is the uncertainty each bidder faces regarding the value that other bidders place on PCS licenses. One way to reduce such bidding complexity is to encourage bidders to reveal to others, through their bids, their valuations for individual and groups of PCS licenses. Such information is revealed in an oral auction (or its electronic equivalent).[31] In such an auction, each bidder has the incentive to stop bidding when the auctioned item's price exceeds the bidder's willingness-to-pay. This is a simple strategy for each bidder.[32]

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[30] See NTIA Staff Paper at 67. This problem would not exist to the same degree, however, if the Commission were to allow winners of the sealed round and winners of the oral round to submit new sealed bids. See discussion supra note 19. This would permit bidders in the oral round to respond to the first round sealed bids. However, it still would not allow for iterative responses by all bidders.

[31] See NTIA Staff Paper 45-46.

[32] In contrast, in a first-price sealed-bid auction, each bidder must anticipate how others will bid when choosing its sealed bid. In such an environment, each bidder must consider the trade-off between bidding too little (and losing the auction)

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The Notice's auction proposal is a good faith effort to grapple with the complexities (and realize the potential benefits) presented by the PCS licensing scheme adopted by the Commission. The Commission recognizes the information-sharing benefits of English auctions and the need to allow parties to acquire groups of licenses. However, we believe that the Commission should use a more powerful and conceptually simpler tool to assign individual PCS licenses and groups of licenses through competitive bidding.

C. NTIA's Proposal

NTIA believes that an "electronic iterative combinatorial auction" (EICA) is a more effective way to address the complex PCS licensing arrangements and accomplish the goals of the auction process contemplated in the Budget Act.[33] Under such an auction mechanism, bidders would be allowed to submit simultaneous electronic bids on any combination of broadband PCS

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[32] (...continued from preceeding page)
against bidding too much (and reducing the surplus it earns from the auctioned item). As a result, a first-price sealed-bid auction creates a more complex bidding environment for bidders than an oral auction. Moreover, because the bidder that places the highest value on the auctioned item may not win in a first-price sealed-bid auction, such an auction could generate less revenue than an oral auction.

[33] NTIA recognizes that the Budget Act mandates that the Commission test multiple alternative methodologies for competitive bidding. Budget Act, § 6002(a), to be codified at 47 U.S.C. § 309(j)(3). We believe that NTIA's proposed EICA is an innovative methodology well suited to the complexities of the PCS licensing scheme. Other methodologies may be more appropriate for other classes of licenses.

licenses and would have opportunities to revise their bids (or submit an initial bid) in response to the actions of the other bidders. Applicants would enter their bids on computer terminals. The Commission would use computer software to record and compare the various bids and declare winners of various licenses or groups of licenses. As would be the case in an English auction with a human auctioneer, the winning bidder would be the party that offered the highest bid for a given license, or group of licenses.

Like the Commission's proposal, an EICA would seek to facilitate the aggregation of licenses. However, an EICA would give bidders greater freedom to choose the geographic combinations of PCS licenses that best meet their needs. For example, parties could bid for groups of MTA licenses smaller than nationwide, groups of BTA licenses smaller than an MTA, or groups of BTA licenses that cross MTA boundaries. It also could facilitate the aggregation of licenses across spectrum blocks. This would better promote economic efficiency by enabling the party that most values a PCS license or group of licenses to obtain it.[34] As a consequence, the number of post-auction exchanges would be minimized. The EICA would also tend to increase governmental revenues by enabling bidders to express

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[34] Like the Commission's proposal, the sums of bids for individual licenses would be compared with the highest bids for groups containing those licenses. Using an EICA, however, many more combinations could be compared.

their preferences for groups of licenses of their own choosing in the auction process, rather than in secondary transactions.

Like the Commission's proposed oral auction for individual PCS licenses, an EICA would be an iterative process in which bidders would continuously receive information about the preferences of other bidders and would be able to respond in their own bidding. Conducting such an auction electronically -- that is, using a computer and terminals -- would merely facilitate the provision of information about current bids to all participants. Moreover, the electronic feature of this proposal would simplify the process of determining bidders' desired groups of licenses.

A critical difference between NTIA's proposal and the Commission's proposal is that bidding for licenses would take place simultaneously in an EICA, which would avoid the problems associated with the Commission having to determine an economically efficient sequence for bidding. Computer assistance makes such "simultaneity" possible by its ability to process bids quickly and display them so that all bidders have information on how the bidding is proceeding. This would better enable bidders to place bids reflecting the interdependencies in value that exist among some PCS licenses.

Computer software that can be modified to implement an EICA for PCS is available in the public domain and has been used successfully to allocate resources in a number of applications.[35] Our understanding from computer programming experts is that such software can be customized to incorporate the specific parameters of the Commission's proposed PCS auction with relatively little programming effort. As described in Attachment 2, the Commission could conduct the EICA using standard computer terminals[36] and work stations,[37] or hire an independent contractor to do so.

The application and the Notice of Intention to Bid procedures under an EICA would generally be similar to those proposed by the Commission in its Notice.[38] After determining

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[35] The software, entitled "Adaptive User Selection Mechanism" (AUSM), has been used by the Jet Propulsion Laboratory to assign scientific resources on the space station planned by the National Aeronautics and Space Administration.

[36] NTIA understands that the California Institute of Technology has used an IBM RS 6000 to run AUSM software in competitive bidding experiments.

[37] If the Commission chooses, it could authorize bidders to participate in the auction from across the United States, either through terminals at the Commission's field offices or by using ordinary personal computers connected to the Commission's system.

[38] Notice, paras. 167-68, 170-71. As a matter of economic theory, it would be best if potential bidders are not required to specify the licenses on which they are planning to bid prior to commencement of the EICA. As discussed in Attachment 2 at 1 n.2, forcing bidders to pre-commit to participating in the bidding for specific licenses inhibits their ability to respond to market forces. However, as a legal matter, it may be necessary for the Commission to require prospective bidders to file short-form applications for specific licenses in order to determine whether there are mutually exclusive applications for each license that

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which short-form applications were acceptable for filing, the Commission would issue a public notice announcing the date and time at which bidding would begin, the entities that would be permitted to bid, the security procedures to be followed to verify bidder identity, and instructions for logging onto the Commission's computer system and entering bids.[39]

At the time designated for commencement of bidding, bidders would enter their bids through their individual computer terminals, bidding either on a single license or any group of licenses they desired. At designated intervals, the Commission's computer would identify the current winning bids and notify each bidder of the discrepancy between its bid and the current winning bid. Bidders would then have the opportunity to submit new bids.

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[38] (...continued from preceeding page)
is to be auctioned.

If the Commission does require parties to file a short form application for every license on which they may possibly bid, bidders wishing to preserve their ability to participate flexibly in the auction would file numerous applications, perhaps for more licenses than they ultimately acquire. In this situation, it could be difficult for the applicant to tender the requisite up-front payment, especially using the Commission's proposed formula of 2 cents per MHz per pop. See Notice, para. 126. An alternative would be for the Commission to require the applicant to specify a cap on total bidding expenditures, based on its available credit, and require a percentage of that cap to be tendered as the up-front payment.

[39] In addition to the application requirements discussed in the Notice, paras. 95-101, 128-29, the Commission would need to establish guidelines for potential bidders on how to log onto the system from remote terminals or personal computers, and adopt some form of password system to ensure that only authorized bidders participate in the auction.

The auction would continue for some period of time, either several days or weeks, to allow parties time to consider fully the bidding possibilities.[40] The Commission would terminate the auction at some time, not known in advance, when bidding activity had died down. The computer would generate a list of winning bidders for licenses for which bids have been submitted, and the Commission could then certify the winners as proposed in the Notice.[41]

NTIA believes that a workable EICA for auctioning all 2,562 broadband PCS licenses in the United States can be developed within the statutorily mandated time frame. The Commission should test the EICA before bidding commences, and also, as explained in Attachment 2, conduct practice bidding rounds, open to the public, to familiarize bidders with the electronic bidding process.[42]

The Commission may, however, hesitate to adopt a nationwide EICA without some initial, actual experience with this method. If that is the case, NTIA suggests that the Commission conduct a limited EICA by May 7, 1994. This would give the Commission an

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[40] Attachment 2 at 5-6. The computer program also could provide a mechanism for cooperative bidding strategies, by notifying winning bidders for individual licenses how they could outbid a party bidding on a group of licenses by collectively increasing their bids. See NTIA Staff Paper at 68.

[41] Notice, para. 172.

[42] See Attachment 2 at 2.

opportunity to acquaint the public with this approach, to identify any practical implementation problems, and to receive further comment on it. Once that limited auction is conducted, the Commission could adopt whatever procedural refinements it deems necessary and conduct an EICA for the remaining broadband PCS licenses in the country.

Ideally, the licenses to be auctioned in such a limited application should not exhibit strong value interdependencies with the remaining licenses that would be auctioned in the subsequent comprehensive EICA. In addition, the licenses should be likely to exhibit active bidding to examine how the AUSM software performs under those circumstances. Moreover, enough licenses should be auctioned to determine how bidders are able to evaluate and respond to bidding on multiple combinations. There are several possible candidates.

One possibility would be to conduct an EICA for all the licenses across all channel blocks in an area with limited geographic connections with the rest of the country. For instance, the Commission could auction all the MTA- and BTA-based licenses in the two southernmost MTAs in the state of Florida (Tampa and Miami). While some bidders may prefer to combine these MTAs and BTAs with licenses in adjacent regions, this area essentially is surrounded by water on three sides, so

the number of adjacent markets is limited.[43] In addition, there is likely to be strong bidding activity for PCS licenses yin this portion of Florida, given the growth in industry and population in the state.

Another possibility would be to use an EICA to auction all the licenses in a given channel block, such as the 51 MTA licenses in channel block A. This would confirm the EICA software's ability to process a larger number of combinations, and provide bidders experience in developing bids for numerous combinations. However, bidders would be precluded from aggregating licenses across spectrum blocks as well as geographic markets, which may have a significant impact on both efficiency and revenue.

A final possibility would be to conduct an EICA for a number of narrowband PCS licenses by the statutorily mandated time.[44] Although those narrowband licenses have different economic and

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[43] Two states with comparable geographic characteristics are Hawaii, which has four BTAs, and Alaska, which has three BTAs. Due to the rural and unpopulated nature of much of Alaska, the level of bidding activity in that state may be relatively low, so that this would not be as indicative of the EICA's ability to respond to multiple bidders. On the other hand, there may not be much "combinatorial" bidding activity in the state of Hawaii, as each BTA is separated from the others by the Pacific Ocean, which may limit to some extent the value of owning a combination of licenses.

[44] See PCS Second Report and Order, Appendix A, Subpart D (proposed narrowband PCS rules); Narrowband Personal Communications Services, 58 Fed. Reg. 42,682 (Aug. 11, 1993) (summary of First Report and Order)